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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,407	12/11/2003	Abdelaziz Ikhlef	GEMS8081.201	1406
27061	7590	05/26/2006	EXAMINER	
ZIOLKOWSKI PATENT SOLUTIONS GROUP, SC (GEMS)			KAO, CHIH CHENG G	
14135 NORTH CEDARBURG ROAD			ART UNIT	
MEQUON, WI 53097			PAPER NUMBER	
			2882	

DATE MAILED: 05/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/707,407

Applicant(s)

IKHLEF ET AL.

Examiner

Chih-Cheng Glen Kao

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9, 12-15 and 18-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 12-15 and 18-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Claim Objections*

1. Claim 29 is objected to because of the following informalities, which appear to be minor draft errors including grammatical and/or lack of antecedent basis problems.

In the following format (location of objection; suggestion for correction), the following correction(s) may obviate the objection(s): (claim 29, line 3, “stack wherein”; inserting a comma after “stack”) and (claim 29, line 3, “each of the cellular arrangement”; replacing “arrangement” with - -arrangements- -).

For purposes of examination, the claims have been treated as such. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 8, 20, 26, 27, and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Fujii et al. (US 4982096).

3. Regarding claims 1, 8, and 20, Fujii et al. discloses an apparatus comprising a scintillator array having a plurality of scintillators arranged along a first plane (fig. 9, #151), a photodiode

Art Unit: 2882

array having a plurality of photodiodes arranged along a second plane (fig. 9, #153) different from the first plane and parallel to the first plane, and configured to detect illumination of the scintillator array (fig. 9, #151), the first plane and the second plane orthogonal to a direction of x-ray incidence (fig. 5, #101) on the scintillator array (fig. 9, #151), and an optical mask arranged along a third plane (fig. 9, #150) parallel to the first and the second planes, and disposed between the scintillator array (fig. 9, #151) and the photodiode array (fig. 9, #153), the optical mask (fig. 9, #150) which would necessarily reduce optical transference between a scintillator and a neighboring photodiode, the optical mask (fig. 9, #150) located closer to the scintillator array (fig. 9, #151) than the photodiode array (fig. 9, #153).

4. Regarding claims 26 and 27, Fujii et al. further discloses wherein at least a majority of the optical mask (fig. 9, #150) is disposed adjacent to the scintillator array (fig. 9, #151).

5. Regarding claim 29, Fujii et al. further discloses wherein the step of arranging includes the step of arranging the cellular arrangement of scintillators (fig. 9, #151), the cellular arrangement of photodiodes (fig. 9, #153), and the optical cross-talk mask (fig. 9, #150) in the multi-planar stack (fig. 9), wherein each of the cellular arrangements and the optical cross-talk mask are arranged orthogonal to the central axis of x-ray incidence (figs. 4 and 5, #101) on the cellular arrangement of scintillators (fig. 9, #151) such that at least a majority of the optical cross-talk mask (fig. 9, #150) is disposed adjacent to the cellular arrangement of scintillators (fig. 9, #151).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-5, 7-9, 12-14, 20-22, 24-27, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Possin et al. (US 5430298) in view of Fujii et al.

7. Regarding claim 1, Possin et al. discloses an apparatus comprising a scintillator array having a plurality of scintillators (fig. 1, #112) arranged along a first plane, a photodiode array having a plurality of photodiodes (fig. 1, #124) arranged along a second plane different from the first plane and parallel to the first plane, and configured to detect illumination of the scintillator array (fig. 1, #112), the first plane and the second plane orthogonal to a direction of x-ray (col. 1, line 15) incidence on the scintillator array (fig. 1, #112), and an optical mask (fig. 1, #180) arranged along a third plane parallel to the first and the second planes, and disposed between the scintillator array (fig. 1, #112) and the photodiode array (fig. 1, #124), the optical mask (fig. 1, #180) configured to reduce optical transference between a scintillator and a neighboring photodiode (title).

However, Possin et al. fails to disclose an optical mask located closer to a scintillator array than a photodiode array.

Fujii et al. teaches an optical mask (fig. 9, #150) located closer to a scintillator array (fig. 9, #151) than a photodiode array (fig. 9, #153).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the apparatus of Possin et al. the optical mask of Fujii et al., since one would be motivated to make such a modification to reduce cross-talk (fig. 9) as implied from Fujii et al.

8. Regarding claims 2 and 3, Possin et al. further discloses wherein the optical mask includes a grid of intersecting optical inhibitor elements (fig. 1, #180) dimensionally equivalent to the scintillator array (fig. 1, #112) and the photodiode array (fig. 1, #124).

9. Regarding claim 4, Possin et al. further discloses wherein the optical mask is defined by a plurality of parallel optical inhibitor elements (fig. 1, #180) extending transversely along a width of the photodiode array (fig. 1, #124).

10. Regarding claim 5, Possin et al. further discloses wherein the optical mask is formed of optical absorbing material (col. 5, lines 26-28).

11. Regarding claim 7, Possin et al. further discloses wherein each scintillator (fig. 1, #112) / photodiode (fig. 1, #124) combination defines a detector cell and wherein the optical mask (fig. 1, #180) is configured to reduce cross-talk between adjacent cells (title).

12. Regarding claim 8, Possin et al. discloses an apparatus comprising a first and a second scintillator (fig. 1, #112) positioned adjacently to one another and distanced from one another by

Art Unit: 2882

a given width, a first photodiode (fig. 1, #124) operationally aligned to detect illumination of the first scintillator (fig. 1, #112) and a second photodiode (fig. 1, #124) operationally aligned to detect illumination of the second scintillator (fig. 1, #112), and at least one mask element (fig. 1, #180) of optically absorbing material (col. 5, lines 26-28) disposed in a plane disposed between the first and second scintillators (fig. 1, #112) and the first and the second photodiodes (fig. 1, #124) to reduce optical transference between the first scintillator and the second photodiode and the second scintillator and the first photodiode (title), the at least one mask element (fig. 1, #180) having a width that exceeds the given width separating the first and the second scintillators (fig. 1, #112) from one another.

However, Possin et al. fails to disclose at least one mask element located closer to first and second scintillators than first and second photodiodes.

Fujii et al. teaches at least one mask element (fig. 9, #150) located closer to first and second scintillators (fig. 9, #151) than first and second photodiodes (fig. 9, #153).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the apparatus of Possin et al. the mask element of Fujii et al., since one would be motivated to make such a modification to reduce cross-talk (fig. 9) as implied from Fujii et al.

13. Regarding claim 9, Possin et al. further discloses wherein the first and the second scintillators (fig. 1, #112) are spaced from one another by a lateral gap (fig. 1, #115).



Art Unit: 2882

14. Regarding claim 12, Possin et al. further discloses wherein each scintillator (fig. 1, #112) is spaced from its corresponding photodiode (fig. 1, #124) by a vertical gap (fig. 1, #170).

15. Regarding claim 13, Possin et al. further discloses wherein each mask element (fig. 1, #180) has a thickness at least equal to a height of the vertical gap (fig. 1, #170).

16. Regarding claim 20, Possin et al. discloses a method comprising the steps of providing a cellular arrangement of scintillators (fig. 1, #112), providing a cellular arrangement of photodiodes (fig. 1, #124), each photodiode (fig. 1, #124) configured to detect illumination of a corresponding scintillator (fig. 1, #112), providing an optical cross-talk mask (fig. 1, #180), and arranging the cellular arrangement of scintillators (fig. 1, #112), the cellular arrangement of photodiodes (fig. 1, #124), and the optical cross-talk mask (fig. 1, #180) in a multi-planar stack wherein the each cellular arrangement and the optical cross-talk mask (fig. 1, #180) are arranged orthogonal to a central axis of x-ray (col. 1, line 15) incidence on the cellular arrangement of scintillators (fig. 1, #112) such that the optical cross-talk mask (fig. 1, #180) is sandwiched between the cellular arrangement of scintillators (fig. 1, #112) and the cellular arrangement of photodiodes (fig. 1, #124).

However, Possin et al. fails to disclose an optical cross-talk mask located closer to scintillators than photodiodes.

Fujii et al. teaches an optical cross-talk mask (fig. 9, #150) located closer to scintillators (fig. 9, #151) than photodiodes (fig. 9, #153).



It would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the method of Possin et al. the optical mask of Fujii et al., since one would be motivated to make such a modification to reduce cross-talk (fig. 9) as implied from Fujii et al.

17. Regarding claim 21, Possin et al. further discloses wherein the optical cross-talk mask includes a cellular arrangement of mask elements (fig. 1, #180).

18. Regarding claim 22, Possin et al. further discloses wherein the step of providing an optical cross-talk mask (fig. 1, #180) includes the step of forming a grid of light-absorbing elements (col. 5, lines 26-28).

19. Regarding claims 14 and 24, Possin et al. further discloses wherein the at least one mask is fabricated of at least black polyamide (col. 5, lines 32-40).

20. Regarding claim 25, Possin et al. further discloses wherein the optical cross-talk mask (fig. 1, #180) is constructed to reduce cross-talk (title) between a scintillator (fig. 1, #112) and a neighboring photodiode (fig. 1, #124).

21. Regarding claims 26 and 27, Possin et al. further discloses wherein at least a majority of the optical mask (fig. 1, #180) is disposed adjacent to the scintillator array (fig. 1, #112).

Art Unit: 2882

22. Regarding claim 29, Possin et al. further discloses wherein the step of arranging includes the step of arranging the cellular arrangement of scintillators (fig. 1, #112), the cellular arrangement of photodiodes (fig. 1, #124), and the optical cross-talk mask (fig. 1, #180) in the multi-planar stack (fig. 1), wherein each of the cellular arrangements and the optical cross-talk mask are arranged orthogonal to the central axis of x-ray incidence (col. 1, line 15) on the cellular arrangement of scintillators (fig. 1, #112) such that at least a majority of the optical cross-talk mask (fig. 1, #180) is disposed adjacent to the cellular arrangement of scintillators (fig. 1, #112).

23. Claims 6 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Possin et al. and Fujii et al. as applied to claims 1 and 20 above, and further in view of Mattson et al. (US 6553092).

Possin et al. as modified above suggests an apparatus as recited above.

However, Possin et al. fails to disclose reflecting material.

Mattson et al. teaches reflecting material (col. 4, lines 62-67).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the apparatus of Possin et al. as modified above the reflecting material of Mattson et al. based on the following reasoning. Since reflecting and absorbing materials were art-recognized equivalents at the time the invention was made for reducing cross-talk (col. 4, lines 62-67), one having ordinary skill in the art would have found it obvious to substitute one type of material for another. One would be motivated to make such a modification

Art Unit: 2882

for reducing cross-talk (col.4, lines 59-67) as shown by Mattson et al. and based on what is readily available.

24. Claims 15, 19, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mattson et al. in view of Possin et al. and Fujii et al.

25. Regarding claims 15 and 19, Mattson et al. discloses an apparatus comprising a rotatable gantry (fig. 1, #10) having a bore centrally disposed therein (fig. 1, #14), a table movable fore and aft (fig. 1, #12) through the bore (fig. 1, #14) and configured to position a subject for CT data acquisition (fig. 1, #20 and 30), a high frequency electromagnetic energy projection source (fig. 1, #16) positioned within the rotatable gantry (fig. 1, #10) and configured to project high frequency electromagnetic energy fan beam toward the subject (fig. 1, subject to be placed on #12), and a detector array (fig. 1, #20) disposed within the rotatable gantry (fig. 1, #10) and configured to detect high frequency electromagnetic energy projected by the projection source (fig. 1, #16) and impinged by the subject (fig. 1, subject to be placed on #12).

However, Mattson et al. fails to disclose an array of scintillators, an array of photodiodes, and an array of optical cross-talk inhibitors formed of optically absorbent material and interstitially layered between the array of scintillators and the array of photodiodes, wherein the array of optical cross-talk inhibitors is fabricated from opaque materials, the array of optical cross-talk inhibitors located closer to the array of scintillators than the array of photodiodes.

Possin et al. teaches an array of scintillators (fig. 1, #112), an array of photodiodes (fig. 1, #124), and an array of optical cross-talk inhibitors (fig. 1, #180) formed of optically absorbent

Art Unit: 2882

material (col. 5, lines 26-28) and interstitially layered between the array of scintillators (fig. 1, #112) and the array of photodiodes (fig. 1, #124), wherein the array of optical cross-talk inhibitors is fabricated from opaque materials (col. 5, lines 32-40). Fujii et al. teaches an optical array of optical cross-talk inhibitors (fig. 9, #150) located closer to an array of scintillators (fig. 9, #151) than an array of photodiodes (fig. 9, #153).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the apparatus of Mattson et al. the detector of Possin et al., since one would be motivated to make such a modification for improving photosensor linearity and reducing crosstalk (title) as shown by Possin et al.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the apparatus of Mattson et al. as modified above the optical cross-talk inhibitors of Fujii et al., since one would be motivated to make such a modification to reduce cross-talk (fig. 9) as implied from Fujii et al.

26. Regarding claim 28, Fujii et al. further teaches wherein a majority of the array of optical cross-talk inhibitors (fig. 9, #150) is disposed adjacent to the array of scintillators (fig. 9, #151).

27. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mattson et al., Possin et al., and Fujii et al. as applied to claim 15 above, and further in view of Rushbrooke et al. (US 5682411).

Mattson et al. as modified above suggests an apparatus as recited above.

However, Mattson et al. fails to disclose silicon.

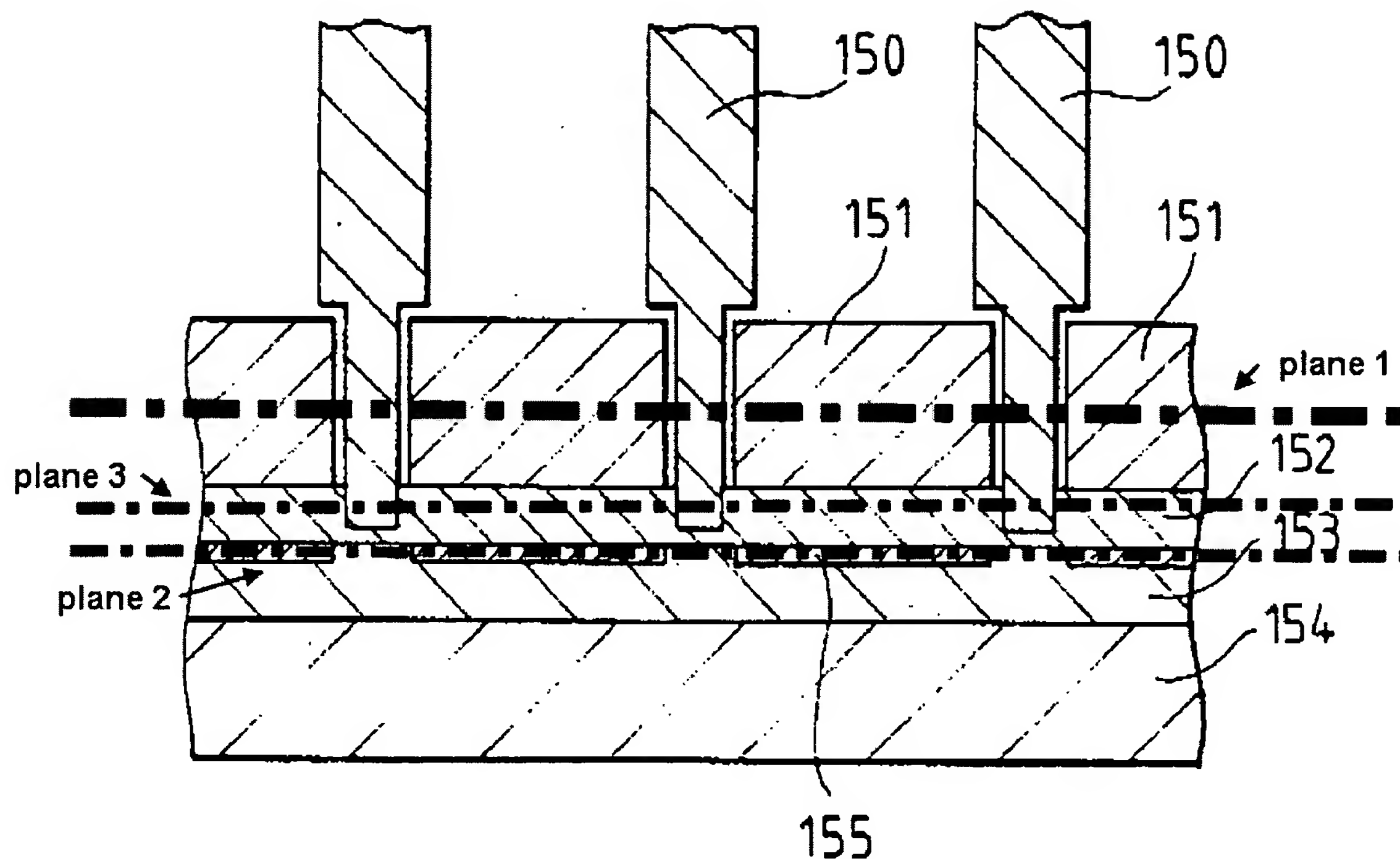
Rushbrooke et al. teaches silicon (col. 2, lines 12-17).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the apparatus of Mattson et al. as modified above the silicon of Rushbrooke et al., since it would have been within the general skill of a worker in the art to select a known material on the basis of its suitability. One would be motivated to make such a modification to reduce crosstalk (col. 2, lines 15-17) as implied from Rushbrooke et al.

### ***Response to Arguments***

28. Applicant's arguments with respect to claims 26-29 have been considered but are moot in view of the new ground(s) of rejection. Applicant's arguments filed 4/7/06 have been fully considered but they are not persuasive.

29. Regarding at least claim 1, applicant argues that Fujii et al. fails to teach or suggest an optical mask arranged along a third plane parallel to the first and the second planes, and disposed between the scintillator array and the photodiode array. The examiner disagrees. Fujii et al. does teach or suggest an optical mask arranged along a third plane (fig. 9, #150) parallel to the first and the second planes, and disposed between the scintillator array (fig. 9, #151) and the photodiode array (fig. 9, #153). This is further illustrated in figure 9 modified below.



30. Regarding Mattson et al., in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references.

Therefore, applicant's arguments are not persuasive, and claims remain rejected.

### *Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (571) 272-2492. The examiner can normally be reached on M - F (9 am to 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

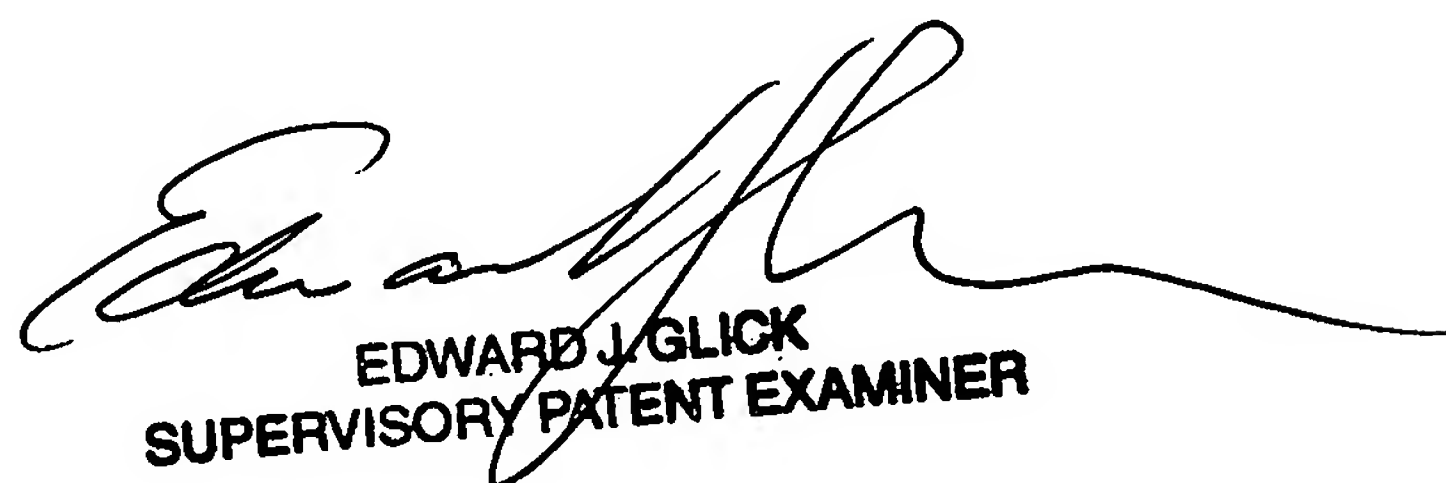


Art Unit: 2882

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gk



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